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Spring Sign

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A SCIENCE SERVICE PUBLICATION

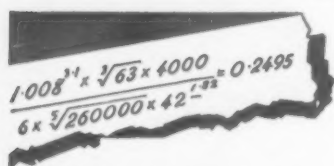
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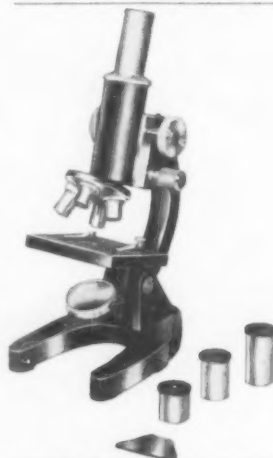
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PUBLIC HEALTH

300-Mile A-Bomb Bursts

Atomic bomb tests high above the earth indicate the same physical principle that is predicted to operate in the laboratory can trap electrons in the earth's magnetic field.

► THE EFFECTS of the three atomic bombs (fission type) exploded 300 miles above the South Atlantic in late August and early September were dwarfed by the hydrogen bombs exploded some 100 miles above the Pacific last July and August.

Only by direct blast action does it seem possible that any bomb explosions could stop an incoming missile. That radiation set up atomically could do this is discounted.

Although scientists are learning much about the earth's magnetic and electric fields by studying information from the Atlantic tests, they could have learned much more from the Pacific ones if there had been rockets and a satellite equipped to take the same kinds of measurements there.

As it is, using only the routine recordings made as part of the International Geophysical Year, scientists have spotted many effects caused by the charged particles released in the Pacific blasts.

A hydrogen bomb exploded high in the atmosphere has been described as affecting the earth's very high atmosphere and magnetic and electric fields as the sun would if it suddenly shone in the middle of the night. These effects included a blackout of radio communications, a visual aurora and pro-

nounced changes in the earth's magnetic field.

The radio blackout was due to the sudden increase in the density of electrons in the upper atmosphere due to gamma radiation produced by the explosion. The magnetic changes resulted from charged particles propagated along the invisible lines of force of the earth's magnetic field.

These same effects were also found from the atomic blasts in the South Atlantic, but to a very much weaker degree. The atomic bursts were reported "low yield" ones by Deputy Defense Secretary Donald A. Quarles. This would be equivalent to about one to five kilotons (thousands of tons) of TNT. The hydrogen bomb blasts are rated in megatons, or millions of tons, and are therefore some 1,000 times stronger.

The records on which U. S. scientists base their studies are being forwarded to Russia under the International Geophysical Year program agreements.

The Atlantic shots, it is suggested, may have been carried out in a hurried and ill-planned manner, in order to make the tests before the U. S. suspended nuclear explosions last fall prior to the start of the Geneva talks with Russia and Great Britain

on an agreement to ban future bomb tests.

The idea of the Atlantic shots resulted from research by Nicholas C. Christofilos, physicist at the University of California's Radiation Laboratory, Livermore, Calif., while working on methods to tame the fusion reaction of hydrogen bombs for peaceful purposes, a program known as Project Sherwood. Last August, Mr. Christofilos reported to an American Physical Society meeting details of a proposed device to do this called "Astron."

Key to the Astron approach is a cylindrical sheet of high-energy electrons. This electron sheet, called the E-layer, would be responsible both for providing the magnetic confinement of the plasma, and for heating it to thermonuclear temperatures.

The Atlantic tests showed that the same kind of mirror effect predicted for the Astron model also works to trap electrons in the earth's magnetic field.

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GEOPHYSICS

Antarctic Studies Yield New Findings

► UNITED STATES scientists covered more miles crossing the Antarctic continent and made more scientific observations during these traverses than all other nations combined.

Albert P. Crary, who recently returned from more than two years in Antarctica, said the concerted International Geophysical Year effort to study the unknown continent had already yielded much new information. He said that these studies included measurements of ice thickness and snow accumulations, and of temperature, winds and other meteorological information, some biological experiments, and charting of the gravitational and magnetic fields.

Among the findings was an ocean bottom depth beneath the Ross Ice Shelf of about 4,400 feet below sea level, at latitude 79 degrees, six minutes south and longitude 165 degrees, 30 minutes east.

Another discovery was the existence in the Horlick Mountains of sandstone-shale coal beds containing leaf fossils and petrified tree remains 12 feet long. The coal beds varied in thickness from a few inches to a few feet. The Horlick Mountains extend eastward from the southeast end of the Ross Ice Shelf for hundreds of miles.

The U. S. Antarctic expeditions covered nearly 8,000 miles, spanning Antarctica from the Weddell Sea to the Ross Ice Shelf and into the Victoria Land Plateau. Mr. Crary organized all of these traverses, and personally covered almost 3,100 miles of them.

Mr. Crary was on leave at the National Academy of Sciences' U. S. IGY Antarctic program from the Air Force Cambridge Research Center. He has served as deputy chief scientist of the program since 1956.

Markers left at regular intervals over some parts of the routes taken during the traverses will help explorers in the future solve the knotty problem of whether the Antarctic glaciers are melting, growing or merely standing still, Mr. Crary said.

Science News Letter, March 28, 1959



SEISMIC EXPLOSION—Ice thickness is measured along an antarctic traverse by using an explosion.

SCIENTIA INTERNATIONAL

NOVAS DEL MENSE IN INTERLINGUA

➤ **Physiologia.**—Trompetters souffre facilmente de vertigine como "hasardo occupational." Esseva trovate per Dr. M. Faulkner de California e Dr. E. P. Sharpey-Schaefer de London—professores de musica e medicina, respectivamente—que le production de alte e prolongate sonos de trompeta require del parte del trompettero un efforto exhalatori que reduce le tension sanguine in le arterias que alimenta le cerebro. Le resultante inadequata de sanguine cerebral es responsabile pro le phenomeno del vertigine de trompettero. Un position sedite es melior pro le trompettero que un position erecte. In position jacentie ille riscara quasi nulle discomforto cerebral, sed il es probable que trompetters in decubito dorsal non essera tolerate per le publico de concerto. Le vertigine in question, del resio, es sin significacion ab le puncto de vista del sanitate del trompettero.

➤ **Morbos Venere.**—Un studio del efficacia de penicillina in le tractamento de gonorrhoea de soldatos american in Corea in 1958 ha demonstrate que 20 pro cento del casos non respondeva positivemente. Isto excede per multo le proportion costumari de 1 a 5 pro cento de non-succesos e indica le developpamento de racias penicillin-resistente del organismo responsabile pro gonorrhoea. Simile observationes ha essite facite in altere partes del mundo.

➤ **Meteorologia.**—Multe bureaux meteorologic del Statos Unite va publicar iste estate, a base experimental, un diurne "indice de discomforto." Iste indice combinara temperatura e humiditate in un sol valor exprime in cifras inter zero e cento. On expecta que circa 10 pro cento del population va sentir se discomfortabile jam ante que le indice attinge 70. Supra 80, le discomforto va esser plus o minus universal. Le valor de un tal servicio es que illo provide un base pro le activation de climatizatores in fabricas e altere locos ubi multe individuos es congregate e differa naturalmente in lor desiros personal. Le indice etiam informara le centrales electrogeneratori quando le intense uso de climatizatores va resultar in forte requirimentos de corrente electric.

➤ **Atomica.**—Le statunitense Commission de Energia Atomic prepara un instrumento pro le detection de radiation ambiental que pote esser installate como parte de omne apparato radio-receptor a transistores. Un tal detector va esser incostose e pote esser producite in massa.

➤ **Statistica Industrial.**—On predice que in 1959 le fabricantes de bira in le Statos Unite va requirer circa 8,900,000,000 lattas in le distribution de lor producto.

➤ **Agricultura.**—Le Congresso del Statos Unite va tosto considerar un bill que propone le establecimento de un nove Consilio de Recercas Agricola e Industrial. In le passato le recercas agricola—in iste como in altere paises—esseva preoccupate quasi exclusive de augmentar le productivitate del agricultura national. In le Statos Unite, isto ha resultate—on lo sabe—in un production excessive que es un del duo major factores in le advenimento del corrente crise agricola. Le altere factor es que le recercas industrial del passate decennios ha resultate in le displacimento de multe productos agricola in lor usos industrial. Per exemplo, in 1945 minus que 25 pro cento del alcohol industrial usate in America esseva de origine non-agricola, i.e. mineral. Le resto esseva facite ex cereales. Dece annos plus tarde le proportion esseva plus que revertite: Solmente un septimo del production national de alcohol industrial esseva distillate ab cereales. Le resto esseva de origine mineral. Le nove Consilio de

Recercas va preoccupar se de disveloppave nove usos industrial pro le productos agricola e non del toto de augmentar le productivitate del agricultura.

➤ **Aeronautica.**—Un association de aeropilotas e proprietarios de aviones ha proponite le adoption de un lege que imponera a aviones in volo a altitudes de minus que 600 m un celeritate maximal de 300 km per hora. Le alte celeritates nunc practicate in le vicinitate de aerodromos, dice le representantes del association, es como si le Queen Mary viagiava a plen vapor inter le porto de New York.

➤ **Physiologia.**—Un physiologo russe ha constatate que undas ultrasonic stimula le secretion de succo gastric. In canes le effecto habeva un duration de tres dies. Le physiologo in question es M. K. Smirnov de Minsk.

➤ **Ichthyologia.**—Le question proque pisces es frequentemente tentate a mangiar le esca (que significa lor morte) in despecto del presentia de un abundancia del micre pisces que es lor nutrimento usual trova un responsa in le hypothese del zoologo californian, Dr. R. B. Cowles, qui crede que predatores es semper attrahite per un preda que se comporta de maniera inusual. Dr. Cowles vide in isto un mechanismo equilibratori del natura. De facto, ille had observate que pisces predatori selige preferibilemente specimens anormal inter le micre pisces que es lor preda rutinari. Tal specimens es frequentemente imperfecte e inferior ab le puncto de vista genetic.

➤ **Historia Natural.**—In le edificio de historia natural del Institution Smithsonian a Washington on ha montate un specimen de elephante african que ha un altor (al spatula) de quatro metros e un centimetro e medie. Le pelle del creatura pesava plus que duo tonnas. Le argilla requirite pro restabilir su forma pesava 4950 kg.

➤ **Paneteria.**—Pan in Israel, como in multe regiones del Oriente Proxime, es pauco molle e plus tosto platte. Multes del habitantes in Israel contemporanee veni de partes del mundo ubi le pan es molle e porose, e illes preferera le tipo de pan de lor ancian paisas a illo de lor nove patria. Usque nunc on ha habite nulle successo in effortos de producer in Israel le tipo de pan molle que le majoritates del israelitas prefera. Le ration pro le platitudine del pan de Israel non es un manco de levatura sed simplemente le facto que pastas de farina ex le tritico dur que es native in le Oriente Proxime non retine le gas generate per le levatura. On crede que iste phenomeno es le effecto de un extreme debilitate del parietes cellular in le farina. Illos rumpe sub le tension del gas in loco de inflar se. On spera—non troppo confidentemente—trovar un methodo de tractamento chimic o mechanic que altera le situation.

➤ **Diagnostica Medical.**—Un rapidissime methodo diagnostic ha essite perfectionate per le Departamento de Hygiene e Education in le governmento american. In le caso de poliomyelitis le methodo ha jam provate su valor, sed illo va etiam esser applicabile a altere morbos. Frottis de sanguine suspecte de infection es coperte de micre quantitates de sanguine animal in que anticorpo contra le antigeno in question es cognoscimente presente. Iste anticorpo ha previelemente essite tincturate per medio de un substantia fluorescente. Quando le preparato es lavate, le anticorpo remane attachate al sanguine sub inspection solmente si illo contine le correspondente antigeno, i.e. le agente pathogenic que on desira identificar. Illo es allora claramente visibile in illumination ultraviolette.

Science News Letter, March 28, 1959

GENERAL SCIENCE

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BIOCHEMISTRY

Build Protein-Like Molecule

A pituitary hormone influencing skin color has been successfully synthesized. The melanocyte stimulating hormone, or α -MSH, becomes largest man-made protein-like hormone.

► THE LARGEST man-made protein-like molecule has been produced. It is a pituitary hormone which causes darkening of human and animal skins.

The synthesis was achieved by Dr. Klaus Hofmann of the University of Pittsburgh department of chemistry.

Dr. Hofmann's work consisted chiefly of linking in a definite arrangement 13 amino acids, the building blocks of all proteins found in the human body. It required six years to make the first minute batch of the substance, which is known as a melanocyte stimulating hormone, or α -MSH.

The hormone is naturally produced in the anterior pituitary gland at the base of the brain. The pituitary is the body's master gland, secreting hormones which both regulate body functions and stimulate other glands to produce hormones.

Synthetic α -MSH may prove useful in treatment of various glandular disorders, such as albinism, caused by lack of the hormone.

As has been the case with many significant scientific achievements, Dr. Hofmann's work was an offshoot of another of his projects, the synthesis of the hormone ACTH. Here is the sequence of events leading to the achievement:

Six years ago, Dr. Hofmann began research on the synthetic production of ACTH. Some four years later, as his progress continued, Drs. A. B. Lerner and T. H. Lee at Yale University discovered α -MSH, isolating it from the pituitary glands of hogs.

Then, Dr. Lerner, in collaboration with Ieuan Harris of the University of Cambridge, took the molecule apart piece by piece and found that its amino acids were linked in exactly the same sequence as part of the ACTH molecule.

When Dr. Hofmann heard of this, he altered his direction to concentrate on the synthesis of the newer hormone.

Having now succeeded in the production of α -MSH, he has shifted back to his original goal, the synthesis of ACTH. All he has to do, essentially, is to continue linking amino acids in the correct pattern to the straight chain of acids making up α -MSH.

Others working with Dr. Hofmann under an American Cancer Society grant were Miriam E. Woolner, Haruaki Yajima, Gertrude Spuhler, Thomas A. Thompson and Eleanor T. Schwartz.

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make a movie of the process of collapsing bubbles.

Photographs have shown that heavy shock waves, with pressures of several hundred thousand pounds per square inch, are caused by the microscopic bubbles generated by a turning propeller. This continual, unmerciful pounding will eventually disintegrate any known metal.

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SUPER CAMERA—Dr. Albert T. Ellis, developer of the ultra high speed camera, cocks the shutter for open flash single shot pictures. At the right is the loading frame for specimens to be photographed. Next to Dr. Ellis is the light which gives 60 times more total light than the most powerful flash bulb. The camera has the usual compure shutter.

ENGINEERING

Movie Film Stands Still

► USING A mirror, an air turbine, two polarized filters, photoelectric eyes, and a flash bulb that must be triggered by 6,000 volts of electricity, a California Institute of Technology engineer has put together a movie camera that can shoot 1,000,000 pictures a second on film that stands still.

Dr. Albert T. Ellis, associate professor of applied mechanics, wanted to see how the collapse of microscopic bubbles generated by a ship propeller could ultimately cause the screw to disintegrate under the impact of resulting shock waves.

To catch this process on film for his study, he devised a special camera with a shutter speed of one 20-millionth of a second. Here is how it works:

The flash lamp, giving 60 times more light than the most powerful flash bulb, is triggered by a 6,000-volt power supply at the critical moment. Two photoelectric cells watch for light to be scattered by the tiny cavitation bubbles. This trips the camera.

The shutter, which can react in one billionth of a second, consists in part of a Kerr Cell—a small transparent glass barrel containing two small nickel electrodes and

a pale yellow liquid called nitrobenzene, a fluid used in shoe polish.

The Kerr Cell is put in the middle of a lens system having two optical lenses for focusing, and two crossed polarized filters.

The filters and Kerr Cell make up the shutter.

Light from the image is polarized in one direction by one of the filters. When it hits the Kerr Cell, it may or may not be acted upon by an electric pulse of 19,000 volts. If not, the second filter blocks the light from going further. But if present, the voltage in effect twists the light so that it can scoot through the second filter. This critical 19,000-volt light-shifting device is fed in fast pulses by a vacuum tube developed for radar.

Light that does pass through this entire assembly is then focused onto a mirror in the film box. The film itself is stationary, for it would burn up if it had to move at the speeds required. The mirror, attached to the rotor of an air turbine borrowed from a jet plane's refrigeration system, spins inside the film box 100,000 times a minute, throwing images on the film in sequence to

METALLURGY

Purer Molybdenum Powder Made Faster

► A NEW PROCESS for the production of molybdenum metal powder is said to produce the powder five to eight times faster than current methods.

Molybdenum is a refractory metal finding increasing uses in the expanding atomic, missile and other high temperature fields.

The production process, invented by Lester D. Supiro of East Orange, N. J., and announced by Metals and Residues, Inc., Springfield, N. J., makes molybdenum powder by a rapid, single-stage reduction of molybdenum oxide at high temperatures. Because of its extreme volatility molybdenum oxide is now mainly reduced in two stages.

Mr. Supiro's process is claimed to be superior to older processes in offering greater speed and economy of energy. It also affords higher recoveries and a powder of higher purity.

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PUBLIC HEALTH

Russians Have "Hot" Food

While it will be an estimated two years before American grocery stores carry irradiated foods, the Russian housewife is said to be buying irradiated food now.

► THE RUSSIAN housewife can purchase potatoes that have been preserved by irradiation. American housewives cannot.

The Russians are first on the market with irradiated food, the U. S. Public Health Service reports in its *Public Health Reports* (March).

Yet, the United States is miles ahead of Russia in the field of research with various types of irradiated food, said Dr. R. G. H. Siu, technical director of research and engineering, U. S. Army Quartermaster Corps.

Researchers in the U. S. are feeding irradiated foods to several generations of several species of animals to observe what effects, if any, are due to this method of preservation, he explained.

The researcher predicted it will be at least two years before irradiated foods find their place on grocery shelves. The Food and Drug Administration stamps final approval on all foodstuffs. Until scientists can prove to FDA and themselves that there is no slightest possible harmful effect from the process, irradiated food will remain a novelty.

The U. S. has irradiated potatoes (inhibiting their sprouting ability), meats, veg-

etables and milk. Potatoes require a low dosage of treatment, 10,000 rads. A rad is the amount of energy required per gram of foodstuff, Dr. Siu explained.

On the other hand, meats, such as roasts of pork and beef, require between 2,000,000 and 4,000,000 rads. The day may come when the housewife can pick a cellophane-wrapped, irradiated roast from the grocery shelf, not refrigerator, pop it into the oven to warm up, and serve just as she now prepares the "brown and serve" rolls.

This research is not directed only at solving some of the housewife's needs, Dr. Siu said. The men who will eventually fly in space capsules will need food supplies. It is not inconceivable that they will carry irradiated Southern fried chicken on interplanetary journeys. And it will taste like Southern fried chicken, Dr. Siu promised.

Irradiation protects food from harmful bacteria by killing the organisms. Some of the nutritive value of some foods is destroyed in this process. This amounts to no more, and in some cases, less than that lost by conventional canning methods now used, he said.

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GENERAL SCIENCE

Atomic Ships Safe

Radioactive wastes from atom-powered surface ships can be disposed of safely, without harm to crew or marine life, according to results of experiments with models.

► EXPERIMENTS with models have led investigators to believe that radioactive wastes of atom-powered surface ships can be disposed of safely at sea.

Richard H. Snow and Jan Rosinski, Armour Research Foundation, Chicago, told the American Institute of Chemical Engineers meeting in Atlantic City, N. J., that dispersion of radioactive fission products may be "accomplished largely by the mixing of the propeller." Further natural turbulence of the sea, they said, would diffuse the waste even more.

The "hot" wastes would come from the ship's reactor, and will consist of "bulky fractions of fission products which are not economically reprocessible."

The men said fish probably would not be dangerously contaminated. The "likelihood that individuals will eat only fish which have lived much of their lives in the wake of nuclear-powered ships is extremely remote.

"Microscopic organisms which serve as food for fish may rapidly become contaminated in local regions of the sea," they said, "but they will be dispersed by the natural turbulence of the water about as fast as the waste itself is dispersed." Thus, they concluded, "it is unlikely that fish will eat mainly contaminated microorganisms and thereby become contaminated."

Fuels for supersonic airplanes and missiles are expected to cost more than the present price of jet fuel. These hydrocarbon fuels may cost five to ten times as much, the Institute was told by Ernest E. Donath and Martin Hess, Koppers Company, Pittsburgh, Pa.

In the field of management, the Institute was told that any business that neglects technology is courting government ownership. Kenneth M. Watson of Illinois Institute of Technology, Chicago, said a ten-year study of the technological performances of 40 large oil and chemical companies shows

"the free enterprise system is fighting for its life in a world-wide competition which is basically technological in character."

"Business," he continued, "is now paying for its shortsighted abuse of labor a few generations ago. Sustained abuse of technologists could lead to the destruction of business and the free-enterprise system."

He recommended that technologists should try to learn business principles. Non-technical managements "whose success record is not good" should try to understand the technological point of view, he added, and "assimilate it rather than exclude it."

Moorehead Wright, General Electric Company, Ossining, N.Y., warned against the "crown prince" theory of developing only "bright young men" in business. Opportunities for development must be universal throughout a company, he said, and there should be no dividing line between "promising men" and "unpromising men."

He cited an instance where only 37% of 143 "promising young men" of ten years ago turned out to have achieved the success predicted for them, and reminded the Institute that Abe Lincoln was a "consistent failure in his early life."

Science News Letter, March 28, 1959

MEDICINE

Dizzy Trumpet Players Due to Pressure Drop

► DIZZINESS is an occupational hazard faced by musicians who choose the trumpet.

Trumpet playing affects blood circulation to the brain in much the same manner as does closing the mouth and nose and forcibly exhaling, two professors, one of music, the other of medicine, report in the *British Medical Journal* (March 14).

While a high note was played for 17 seconds on the trumpet, the pressure in the artery of the musician's free arm was measured. In addition, the pressure on the subject's mouth and esophagus were measured at the same time, Dr. M. Faulkner, University of California, Santa Barbara, and E. P. Sharpey-Schafer, St. Thomas's Hospital, London, explain.

The pressure in the artery being measured dropped enough to cause an inadequate flow of blood to the brain. Dizziness and blackout can result from these fluctuations, the professors say.

Measurements of the pressures on the mouth and artery were recorded while the oboe and French horn were played. The lower results, when compared with those of the trumpet player, suggest that trumpet playing requires more "blow-how."

Nonetheless, although trumpet playing produces high pressures in the chest compared with other instruments and normal straining, it still does not approach the pressure levels that result from coughing. Apart from the discomfort of occasional dizziness, trumpet players are not likely to be harmed, the doctors reassure.

They do suggest, however, that it would be better for the trumpeter to sit than stand while playing. The ideal position, although impractical for a concert, would be a lying down one.

Science News Letter, March 28, 1959

PUBLIC HEALTH

Fallout Danger Cited

Fallout should be watched and controlled as much as possible as it increases in intensity each year, one expert has warned. Fallout measurements being made in next few months.

► THE INVISIBLE rain of radioactive particles from H-bombs exploded by the U. S. and Russia is increasing in intensity each year, figures prepared by Atomic Energy Commissioner Dr. Willard F. Libby show.

Because the biological effects of the increasing fallout on the world's population are largely unknown, "care and caution" must be taken in adding to radioactive contamination of the atmosphere, Dr. Libby reported in a speech at the University of Washington, Seattle, delivered in his absence by Dr. J. Calvin Potts, special assistant. (See p. 205.)

Dr. Libby predicted the major questions concerning how and when fallout occurs will be answered by measurements made during the next weeks and months, but the "tremendous problems" of biological consequences will remain. Therefore, fall-

out should be watched and controlled as carefully as possible.

Dr. Libby believes that the radioactive material introduced into the earth's high atmosphere, or stratosphere, when H-bombs are exploded, mixes rapidly, then leaks down uniformly over the world. This fallout each year is 16% of the total accumulated in the stratosphere and seeps into the troposphere, about the first 40,000 feet of atmosphere. Radioactive debris is removed from the troposphere in about one month by normal weather processes and by striking the surface of trees, grass and other features.

A "tremendous rise" in fallout rate occurred in October, 1958, Dr. Libby found, due to the Russian test series in the polar regions. Measurements after those tests and the U. S. ones of the Hardtack series in which special isotopes tungsten-185 and

rhodium-102 were added, will show the mechanism by which the fallout reaches the earth's surface.

Dr. E. A. Martell of the Air Force Cambridge Research Center suggests the increases in fallout rate that have occurred each spring for several years are due largely to Russian tests, which have spewed debris into the lower and intermediate levels of the stratosphere where the radioactive materials remain only about six months. The measurements now being made will show whether this theory is true, and they may also show how much the Russian tests have contributed to worldwide fallout. Dr. Martell's theory will be reported in *Science*, according to Dr. Libby.

Science News Letter, March 28, 1959

PHYSICS

Charged Waves Cause Electric Sparks

► AN ELECTRIC spark, called "the least understood of all physical phenomena" has been found to be produced by a series of electrically charged waves, which sweep rapidly back and forth to build up a channel to carry the current. Dr. Leonard B. Loeb of the University of California, who reported this finding to the American Physical Society meeting in Austin, Texas, used an "electric eye" and new ultra-fast measuring equipment in his research.

In the past, he said, before development of these powerful new devices, it would have been impossible to measure the waves that caused a one-inch electric spark.

Science News Letter, March 28, 1959

BOTANY

Trailing Arbutus Marks First Arrival of Spring

See Front Cover

► CLUSTERS of delightfully fragrant white or pink flowers are among the first harbingers of spring. The trailing arbutus or mayflower is usually found on the borders of rocky woods and hillsides in the very early spring.

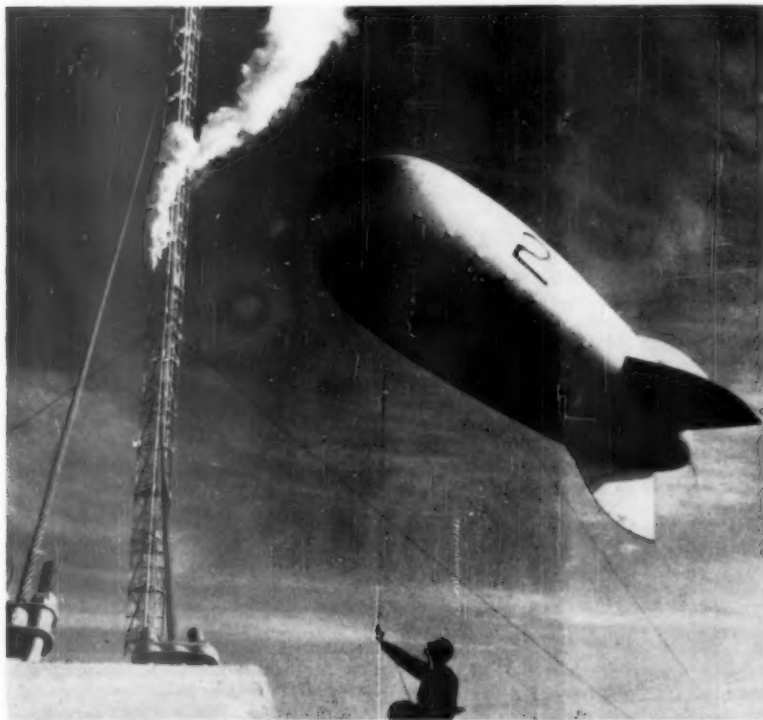
The photograph on the cover of this week's *SCIENCE NEWS LETTER* shows a close-up of the delicate flowers, their large broad leaves and hairy stems. The plant, *Epigaea repens* as it is called scientifically, should not be picked since it is one of our disappearing wildflowers.

Trailing arbutus is found in the northeastern states, with a range from Newfoundland to Florida and Kentucky.

The plant, which belongs to a group of evergreen perennials with woody creeping stems, can be grown in the garden if given acid soil and shade and if their natural conditions are imitated. Propagation by seed is much more satisfactory than by division. Seeds should be sown as soon as they are ripe.

A closely related flower, *Epigaea asiatica*, is found in Japan. It differs in part from the trailing arbutus in the shape of its leaves which are basically oblong.

Science News Letter, March 28, 1959



AIR SAMPLER—A weather blimp is being sent aloft, carrying air sampling devices. A General Electric Company meteorologist guides the blimp. Smoke is emitted from the 410-foot weather tower by a machine that breaks oil into a fine spray. By collecting samples at varying distances from the tower, meteorologists can determine the most favorable conditions for releasing radioactive particles into the atmosphere from exhaust stacks at G-E's Hanford atomic plant in Richland, Wash.

PSYCHIATRY

Mental Cases to Run Own Wing in Hospital

► A NEW WING which is being added to an English mental hospital will be run entirely by the patients. Doctors and nurses will enter it only by invitation.

Administration will be by a committee of patients, which will have a room for meetings and for keeping its records. Patients will themselves decide how they wish to spend their time, and they will be free to invite relatives and friends inside.

The hospital where this experiment will be made is the Coppice Hospital, Nottingham. The project has received approval of the Minister of Health and it is hoped to bring the wing into use this year.

"Even when a patient is mentally fit again," said one of the doctors, "he has to learn again to live with other people in a normal setting. This resocialization is a vital process."

"If it is done within the walls of an ordinary hospital, the difficulty is that patients are always aware that they are patients and the staff that they are staff. This relationship cannot be broken down by goodwill."

"We plan to solve the difficulty by physical separation of the hospital from this new wing, which will be the patients' own. We shall go in only when we are asked to give advice or help. We hope patients will have many visitors and much help from friends and families."

There will be a tea bar which can be divided into small sections when patients want to hold a birthday party or some other function. There will be a lounge, store, music room, an artist's studio and a stage with dressing rooms.

Science News Letter, March 28, 1959

ENGINEERING

Electric Drive Designed For Manned Spacecraft

► A NUCLEAR-FUELED electric powerplant has been designed to drive man deep into space in big interplanetary space vehicles. It would weigh about 60 tons and could supply 20,000 kilowatts of electricity. It would have a full-power life of about two years.

The National Aeronautics and Space Administration indicated that the powerplant's life would let a manned space vehicle pull away from an earth orbit, descend into an orbit about Mars, and return to an earth orbit through operation of its thrust unit for about 250 days.

The design was created by Robert E. English, Henry O. Slone, Daniel T. Bernatowicz, Elmer H. Davison and Seymour Lieblein of NASA's Lewis Research Center, Cleveland, Ohio.

The design calls for the "nuclear turbo-electric powerplant" to use sodium vapor as the working fluid, and liquid sodium as the reactor coolant. The nuclear reactor would be situated at one end of the vehicle and with the crew's quarters at the other.

Although an ion jet would shoot from

a ring near the crew's quarters, to drive the craft, the crew would be protected from radiation by various shields around the reactor, and by a big heat radiator between the electric generator and the crew capsule.

The whole spacecraft would rotate slowly about its long axis to provide artificial gravity, through centrifugal force, for the crew. The structure that ties the reactor and the crew compartment together is specified to be rigid so that the crew quarters would not be slung out of the radiation-protective shadow of the big heat radiator.

For this craft, no sleek rocket-like style is indicated. The vehicle likely would be built in space and never land anywhere. It probably would be used strictly between space stations in orbit around planets. Other types of space craft probably would get man from earth to the space station, then back down again.

Science News Letter, March 28, 1959

CONSERVATION

Hold Hearing on Revised Senate Wilderness Bill

► THIS SUMMER we may get our national wilderness.

The talk seems about to end and the action to begin.

This can mean that, for the first time in the nation's history, several million acres of lands will be protected against careless or hasty hands that might destroy a national heritage. Wilderness that has remained much like the land of the early settlers and Indians will be preserved for future generations.

Proponents of the revised Senate bill, S. 1123, are hopeful that after several years of study, hearings, proposed bills that never passed, and a general "education" program, their legislation will be passed. Two more hearings have been scheduled in the West for March 30, in Seattle, Wash., and on April 2, in Phoenix, Ariz. At these hearings interested persons, including the oil, mining and lumbering industries, can present their case for or against wilderness legislation.

As a result of earlier hearings held after Congress recessed in 1958, certain changes have been made in the proposed bill.

Now, as the revised S. 1123 reads, the Secretary of Agriculture would have 20 years, not ten, for making boundary modifications in the so-called primitive lands. Also as a result of hearings held in the western states, the consent of the Indian tribes concerned would be needed before their lands could be included as wilderness. These are but two of several changes.

Many persons in the fields of conservation and wildlife protection believe all objections to the proposed bill have been answered. Commercial interests do not now have access to many of the areas that would be protected, they point out. Current agreements involving commercial use of these lands would be honored under the new bill.

In effect, the wilderness bill would simply make it an official policy of our national Government to protect and preserve the wilderness.

Science News Letter, March 28, 1959

IN SCIENCE

BIOLOGY

Tadpole Study May Aid Human Disease

► TADPOLES may soon be helping scientists study arthritis and other diseases of the connective tissue.

When they are reared in water containing certain chemical compounds known as nitriles, toad and salamander embryos develop tumors. These compounds produce tumors and lesions experimentally in the same way that an extract of sweet pea seed does, Barnet M. Levy of the University of Texas Dental Branch, Houston, explains.

Scientists are interested in the compounds because of similarities between several human diseases of the connective tissue and this "experimental lathyrism" — so-called after *Lathyrus odoratus*, the scientific name for sweet pea.

Now, Dr. Levy reports, several more compounds have been found that cause lathyrism. These are all water-soluble aldehyde blocking agents causing tumors in the animals by the end of one week. The technique provides an accurate and fast screening method for seeking new lathyrism-causing agents, Dr. Levy says.

Our findings suggest that there may be some defect with the carbohydrate metabolism of the connective tissue ground substance, Dr. Levy concludes in *Science* (March 13).

Science News Letter, March 28, 1959

SOCIOLOGY

NSF Establishes New Office of Social Sciences

► BASIC RESEARCH in the social sciences is coming in for some needed recognition with the establishment of an Office of Social Sciences by the National Science Foundation.

Previously the NSF program in the social sciences had been part of the general natural sciences program. The new office "represents a further step in the development of the Foundation's program in support of basic social science research."

The Foundation said it is "proper and desirable to support basic research in the social sciences, since such support is invaluable in assisting social scientists to improve their research techniques, to accumulate fundamental knowledge about human behavior and society, and to develop sound theoretical bases for further inquiry."

Dr. Henry W. Riecken, currently on leave from the University of Minnesota, is head of the new office. An eight-member committee has also been set up to advise the National Science Foundation on program and policy in support of the social sciences.

Science News Letter, March 28, 1959

IE FIELDS

SOCIOLOGY

Scientists and Engineers Oppose Unionization

► SCIENTISTS and engineers overwhelmingly oppose collective bargaining as a means of improving their salaries and working conditions in industry.

Their principal reasons for opposing any form of unionization were:

1. It is unnecessary, offers no advantages and might even be harmful.

2. Salaries and promotions would not reflect the individual's performance, responsibilities or qualifications.

3. It would reduce professional productivity and development.

These attitudes were disclosed in preliminary findings of a survey by the Bureau of Industrial Relations, University of Michigan. The findings represent interviews with more than 250 scientists and engineers from four chemical firms, two automotive companies, two electronics manufacturers and two public utilities.

Some 50% of the interviewees strongly opposed collective bargaining, while 29% were mildly opposed and 3% had no opinion. In favor of organization along union lines were 10%, and 8% believed their professional societies could act as middlemen between employees and management.

The 18% favoring collective bargaining gave as their main reason the attainment of higher salaries and more equitable salary adjustments.

Science News Letter, March 28, 1959

ENGINEERING

Powerful Gas Turbine Meets Electric Load Peaks

► A POWERFUL gas turbine has been developed to help electric power companies meet their troublesome peak loads more economically.

Fired by natural gas or distillate oil, the machine can be brought on the line by remote control in 20 minutes to supply the extra power needed briefly as thousands of housewives switch on electric stoves and lights in the early morning, or as thousands of air conditioners snap on in the humid afternoon heat.

The machine is especially designed for short-run operation, Charles W. Elston, general manager of General Electric Company's gas turbine department, reported. It squeezes 20,500 kilowatts for a short time out of a machine rated for around-the-clock operation at 16,500 kilowatts.

One of the units already has been called for by the City of New Orleans. However, it will be used to supply electricity to the city's electric pumps after heavy rains, rather than to meet the peak demand on an electric utility's power system.

It is predicted that this type of machine

will soon become the electric utility's ace-in-the-sleeve. Until now, utilities have met fast-growing electric demand with new and bigger machines, using older, less efficient machines for "peaking."

Until recently, the new, more efficient machines offset the economic penalties of using old machines for peaking. But now, said Mr. Elston, the new steam power plants do not offer the substantial improvement in efficiency which previously offset the system's overall cost of power generation.

Advantages cited for the gas-turbine peaking machines are: 1. its 20-minute get-up-and-go record; old steam-driven machines might require many hours of lead time, 2. its ability to be operated remotely and situated wherever convenient without an attendant, 3. its comparatively negligible demand for cooling water, and 4. its quiet, clean operating characteristics.

Science News Letter, March 28, 1959

PHYSICS

Russia May Overtake U.S. In Heavy Nuclei Studies

► RUSSIA may overtake the United States in the discovery of new elements and study of heavy nuclei, a basic science area in which America has been dominant.

This was suggested by Dr. Glenn T. Seaborg, Nobel laureate at the University of California, who has taken part in the discovery of nine out of ten transuranium elements, including plutonium, element 94.

Dr. Seaborg was officially inaugurated as chancellor of the Berkeley campus on March 20. In the University's faculty research lecture, he said, the Russians are building an ultra-high flux research reactor, which is a key to studies of the very heavy elements. No such reactor has been authorized in this country.

Object of such a reactor is to produce an enormous barrage of neutrons, duplicating in a modest way conditions of super novae and hydrogen bombs. Uranium atoms can capture a number of neutrons and be "fattened up" to become heavier atoms. Milligram quantities of californium, element 98, could be produced; this is a huge quantity in terms of this element.

Such quantities of californium would provide a better target for bombardment with heavy nuclei in the Hilac accelerator, making possible production of elements ranging up to 104, 105 and higher. At present only invisible amounts of californium can be produced and only after years of waiting.

An ultra-high flux reactor would cost \$10,000,000, generate about 100,000 kilowatts in a core of only about a cubic foot volume, and in this core generate five million billion neutrons per second per square centimeter.

Increasing competition from the Russians in the heavy element work is indicated by their discovery, said Dr. Seaborg, of an isotope of element 102. Berkeley scientists, including Dr. Seaborg, discovered isotope 254 of element 102 last year. Apparently the Russians have discovered isotope 253, although identification is not yet certain.

Science News Letter, March 28, 1959

ROENTGENOLOGY

Red Frostbites Get X-Rays; U. S. Antibiotics

► CHANCES ARE that a Russian who suffers frostbite on his fingers or toes will receive X-ray treatment while an American will receive antibiotics.

Thirty patients at the Tomsk Medical Institute in Moscow received radiation treatment for frostbite on the fingers, toes, wrists, hands, feet, and knee joint.

Circulation improved in the frostbitten areas after the first or second radiation treatment, V. N. Agafonova, chair of surgery of the sanitation faculty at the Institute, reports.

The dead tissue also sloughed off within 12 to 15 days. Currently, American doctors use antibiotics to treat frostbite. These control infections that arise, Dr. Gregory Henesy of the radiology department of Washington Hospital Center explained.

The tissue damage that results from frostbite is permanent. Skin that has been effectively destroyed is beyond saving, he added. X-ray treatment was used before World War II but has since been abandoned in the treatment of frostbite here in the United States.

It is still used occasionally to deaden pain or control infections that cannot be curbed by antibiotics, but the use of radiation does not alter the course of the condition itself, Dr. Henesy said.

But the Russians state that their results prove that the blood circulation in the injured tissue is favorably affected by the use of X-rays.

The Russian report was translated from the *Vestnik Rentgenologii i Radiologii*, (Sept./Oct. 1958) by U. S. Government researchers.

Science News Letter, March 28, 1959

ICHTHYOLOGY

Fish Become Unhappy When Taken From Home

► A FISH taken from his home becomes unhappy, and like unhappy people in similar circumstances, he may commit foolish acts or behave differently, reports C. W. Threinen, administrative assistant in the Wisconsin Conservation Department.

Mr. Threinen said that one of the first acts of a trout upon being released from his hatchery home into strange waters is to look for an unoccupied home.

If he cannot find a new home quickly, the trout may literally run himself to death in his search. In fact, in some cases as many as 50% of the trout planted in streams have been known to die within the first two weeks after planting.

Writing in the *Wisconsin Conservation Bulletin*, Mr. Threinen said biologists have found that the stress of a new environment may cause the lactic acid level of the blood to rise to the point where death results. Because of this, it is a good policy to stock streams close to the opening of the season, and to stock in heavily fished streams, which have few competing trout.

Science News Letter, March 28, 1959

ASTRONOMY

Venus and Jupiter Prominent

An annular eclipse of the sun will occur early in April, a month that will have two planets prominent in the evening skies.

By JAMES STOKLEY

► SHINING FOR THREE hours after sunset, the planet Venus now dominates the western evening sky. More than 60 times as bright as a typical star of the first magnitude, it appears long before any other star or planet, so there is no doubt of its identity.

Hardly has Venus descended below the western horizon, before another planet, only slightly less brilliant, rises in the southeast. This is Jupiter, a quarter as bright as Venus, and still overpowering any star.

At the beginning of April Jupiter rises, in the constellation of Scorpius, the scorpion, a little more than an hour after Venus sets. On April 12 there is no interval between the setting of one and the rising of the other. The new actor appears on the celestial stage just as the old one is exiting. By the end of April it will be possible to see both in the sky at the same time.

Mars Receding

A third planet is also visible. This is Mars, still receding from the earth. At the middle of April its distance is about 161,000,000 miles, and because of this it has faded from its brilliance of a few months ago. In fact, it is just on the borderline between first and second magnitude.

The accompanying maps show the appearance of the skies about 10:00 p.m., your own kind of standard time, at the beginning of April, an hour earlier at the middle of the month and two hours earlier at the end. Venus is seen near the horizon, toward the northwest, in Taurus, the bull, and to the right of the bright star Aldebaran. Mars is higher, in Gemini, the twins, in which there is the first-magnitude star called Pollux. Castor, the other conspicuous star in this group, ranks only in the second magnitude. Jupiter does not show on the maps, but Scorpius, in which it stands, is just below Libra, the scales, which is shown near the southeastern horizon.

Directly west, and near the horizon, is Orion, the hunter, which was so conspicuous in the south on winter evenings. Here is seen the star called Betelgeuse. Toward the left, in Canis Major, the great dog, is brilliant Sirius. Above this is the lesser dog, Canis Minor, with Procyon.

High in the south these evenings is Leo, the lion. The right hand part of this group, which is supposed to form the animal's head and shoulder, make a smaller group called the sickle. The first magnitude star Regulus is at the end of the handle. Deneb-

ola is a second magnitude star in the lion's tail.

Next to Leo, toward the left and a little lower, is Virgo, the virgin, for which Spica is the brightest star. And above Virgo, in Bootes, the bear-driver, is Arcturus. Part of Bootes is shown on the map of the southern sky, and part on the northern, where it comes close to the end of the handle of the Big Dipper, which is not a constellation in its own right, but a part of Ursa Major, the great bear.

The dipper is now high in the northern sky, in about its best evening position of the year. In the bowl of the dipper are two stars best known as the pointers, because a line drawn through them leads to Polaris, the pole star, which is now below them. Polaris is at the end of the handle of the little dipper, and this, in turn, is part of Ursa Minor, the lesser bear.

Low in the sky, toward the north, is Perseus, the champion; Cassiopeia, the queen, and Cepheus, the king. Also, low in the northeast, the map shows the star Vega, all that is visible of Lyra, the lyre. But later at night it climbs higher into the sky, as it will in the evenings later in the year. By midsummer, in fact, Vega is almost directly overhead in the evenings.

In addition to Venus, Mars and Jupiter, there are two other planets that can sometimes be seen with the naked eye.

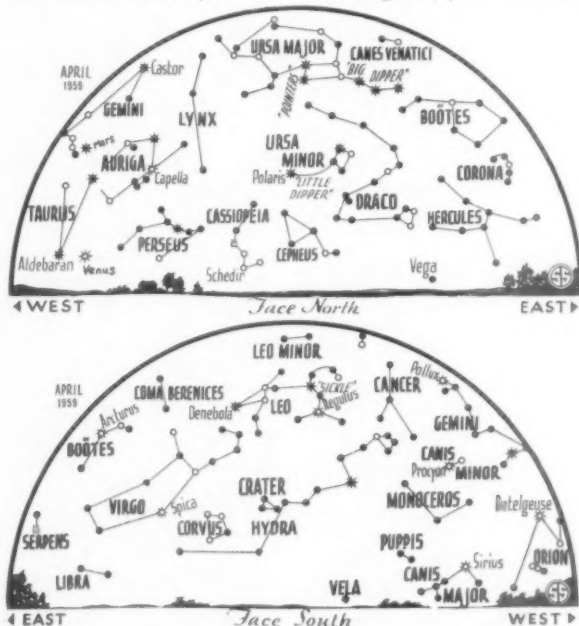
One of these is Saturn, which is now in Sagittarius, the archer. It comes up about 1:00 a.m. at the first of April and about 11:00 p.m. at the end. Mercury is the other. On April 26 it will be farthest west of the sun, and will rise a little ahead of that body, becoming visible low in the east at dawn for a few days. This, however, will not be a very favorable time to see this planet.

April also brings an eclipse of the sun, the first of two this year, but this one will not be visible from the United States, or any part of North or South America. It will, however, be seen over a large area, including Australia and New Zealand, and much of the Indian Ocean and the southwestern Pacific.

Solar Eclipse Due

This is what is called an annular eclipse. Any eclipse of the sun occurs when the moon comes in front of it, and hides it, more or less, from view. But the distance of the moon varies each month, from perhaps 222,000 to 252,000 miles. When farthest, it does not appear as large as when it is nearer. In fact, it is then not large enough to cover the sun's disc completely. Then, even though it may come precisely in front of the sun, a ring-shaped area of the solar surface can be seen around the black disc of the moon. This is called the annulus, from the Latin word for ring, and so we have the name annular eclipse.

From a ship in the Indian Ocean, at about 42 degrees south latitude, 72 degrees east longitude, just the sun was rising



• * • • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

in the east on April 8, the beginning of this annular eclipse could be seen.

The path over which the ring may be seen goes northeastward to Perth, Australia; then traverses that continent to Cape Melville on the northeastern coast; crosses the Pacific Ocean, and Guadalcanal and San Cristobal in the Solomon Islands. The path comes to an end as the sun is setting, at about ten degrees south and 168 degrees west, which is in the southwestern Pacific Ocean.

The eclipse will be at its maximum where the path crosses northern Australia; there the annulus will be visible for seven minutes 26 seconds.

Over a much larger area, including the rest of Australia, New Zealand, part of Antarctica, Borneo, the Celebes and New Guinea, there will be a partial eclipse. In this region the moon will partially cover the sun, with a larger portion hidden the nearer the place is to the path of the annular eclipse.

A curious feature of this eclipse is that it ends the day before it starts!

This is because, in progressing from west to east, it crosses the International Date Line, at 180 degrees longitude, the place where the day changes. In the Indian Ocean, as in Australia, it will be Wednesday, April 8. But after it crosses the Date Line, which it does in the late afternoon, it will be in a region of the earth where it is still Tuesday, April 7.

Few Eclipse Observations

Although astronomers often travel long distances to observe eclipses of the sun, as they did last October to Danger Island, also in the South Pacific, where a total eclipse was to be visible, few if any will make much effort to observe the Australian eclipse.

Most of the observations made by eclipse expeditions require that the sun be completely covered. Even the narrow ring of the solar disc left visible at an annular eclipse prevents such work. However, it is likely that many amateur astronomers, and even some professionals, who are located near the path of visibility, will take advantage of their opportunity to see a rare and interesting phenomenon, even though it is of relatively little scientific value.

Celestial Time Table for April

April EST	
7 10:29 p.m.	New moon, annular eclipse.
10 6:00 p.m.	Moon farthest, distance 252,300 miles.
11 1:24 a.m.	Moon passes Venus.
14 5:31 a.m.	Moon passes Mars.
16 2:32 a.m.	Moon in first quarter.
23 12:13 a.m.	Full moon.
1:00 p.m.	Moon nearest, distance 222,100 miles.
24 6:59 p.m.	Moon passes Jupiter.
26 5:00 a.m.	Mercury farthest west of sun, visible low in east before sunrise around this date.
9:00 a.m.	Neptune opposite sun and nearest earth; distance 2,724,000,000 miles.
27 8:33 a.m.	Moon passes Saturn.
29 3:38 p.m.	Moon in last quarter.

Subtract one hour for CST, two hours for MST, and three for PST.

Science News Letter, March 28, 1939

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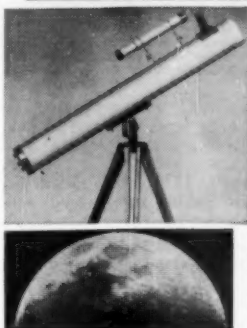
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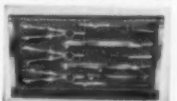
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Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

BUILDING THE AMATEUR RADIO STATION—Julius Berens—*Rider*, 128 p., illus., paper, \$2.95. For the amateur radio enthusiast who has earned his operating license.

CHICAGOLAND BIRDS: Where and When to Find Them—Ellen Thorne Smith—*Chicago Nat. Hist. Mus.*, 48 p., maps by William J. Beecher, paper, 50¢. Exemplary local publication.

THE COLLEGE INFLUENCE ON STUDENT CHARACTER—Edward D. Eddy, Jr., assisted by Mary Louise Parkhurst and James S. Yakovakis—*Am. Council on Educ.*, 185 p., \$3. Exploratory study in selected colleges of the students' development of intellect and cultivation of character.

COMPARATIVE MORPHOLOGY OF VASCULAR PLANTS—Adrian S. Foster and Ernest M. Gifford, Jr.—*Freeman*, 555 p., illus. by Evan L. Gillespie, \$9. Textbook for one-semester course in plant morphology.

CONDUCTIVE DESIGN OF ACTIVE CIRCUITS—Keats A. Pullen, Jr.—*Rider*, 330 p., \$9.95. Presents tube and transistor design by the coordinated method of static and small-signal design techniques.

DEMON OF THE NORTH—Peter Kraft, transl. from German by Edward Fitzgerald—*Knopf*, 260 p., illus., \$5. The experiences of the author and his family while studying the habits of young wolverines in Lapland.

ELECTRONICS FOR EVERYONE—Monroe Upton—*Devin-Adair*, 2nd rev. ed., 386 p., illus., \$6.95. The story of electricity in action: TV, color TV, radio, radar, hi-fi—what they are and how they work.

ELECTROPHORESIS: Theory, Methods, and Applications—Milan Bier, ed.—*Academic*, 563 p., illus., \$15. Collected essays of value to researchers concerned with proteins, polyelectrolytes, and colloids in general.

ENGINEERING—Edward H. Robie—*Bellman*, 36 p., illus., paper, \$1. No. 14 of Vocational and Professional Monographs.

ENVIRONMENTAL CONSERVATION—Raymond F. Dasmann—*Wiley*, 307 p., illus., \$6.50. Text written from a biological standpoint, considering the history of human populations in relation to natural resources.

ERNEST THOMPSON SETON: Naturalist—Shannon and Warren Garst—Messner, 192 p., \$2.95. Biography for boys and girls.

THE EVOLUTION OF CULTURE: The Development of Civilization to the Fall of Rome—Leslie A. White—*McGraw*, 378 p., \$7.50. Anthropologist here demonstrates the validity of a theory of cultural evolution or development.

AN EXPERIMENT IN MENTAL PATIENT REHABILITATION: Evaluating a Social Agency Program—Henry J. Meyer and Edgar F. Borgatta—*Russell Sage*, 114 p., \$2.50. The agency evaluated is the Alto Health and Rehabilitation Services in New York City.

EXPLORING PHYSICS—Richard F. Brinckerhoff, Judson B. Cross and Arthur Lazarus—*Harcourt*, rev. ed., 724 p., illus., \$5.20. Complete senior high school course for college-bound students.

FIFTH TECHNICAL PROGRESS REPORT—W. L. Faith, N. A. Renzetti and L. H. Rogers—*Air Pollution*, 74 p., paper, \$3. Reports on research activities directed toward the automobile exhaust problem.

FILLER METALS FOR JOINING—Orville T. Barnett—*Reinhold*, 244 p., illus., \$7. For the welding engineer and others concerned with material specifications.

HEBREW INSCRIPTIONS AND STAMPS FROM GIBEON—James B. Pritchard—*University Museum*, 32 p., 12 p. of figures, paper, \$1. Monograph on excavations made in 1956 and 1957 in Jordan under the author's direction.

INTRODUCTION TO ZOOLOGY—H. W. Manter and D. D. Miller—*Harper*, 689 p., illus., \$7.50. College textbook.

THE MERCHANTS OF LIFE: An Account of the American Pharmaceutical Industry—Tom Mahoney—*Harper*, 278 p., \$3.75. Detailed stories about more than a score of leading companies and their new life-saving products, for which nine-tenths of the prescriptions are written today.

MITOGENESIS—Howard S. Ducoff and Charles F. Ehret, Eds.—*Univ. of Chicago Press*, 114 p., illus., \$3.25. A report from The Developmental Biology Conference Series held in 1956 under the auspices of the NAS-NRC.

NATIONAL RESEARCH COUNCIL REVIEW 1958—E. W. R. Steacie, President—*Nat. Res. Council (Canada)*, 337 p., illus., paper, 75¢. Reporting the scientific work of the Council during 1957, including some later work.

NEW BIOLOGY 28—M. L. Johnson, Michael Abercrombie and G. E. Fogg, Eds.—*Penguin*, 133 p., illus., paper, 65¢. Articles on Darwin, on the origin of isolation, automatic mechanical self-reproduction and hair.

NEW WORLD IN THE TROPICS: The Culture of Modern Brazil—Gilberto Freyre—*Knopf*, 298 p., \$5. A sociologist examines Brazil's cultural unity and regional diversity, its ethnic and social conditions, its world-famous architecture.

NOISE IN ELECTRON DEVICES—Louis D. Smul-

lin and Hermann A. Haus, Eds.—*Wiley*, 413 p., illus., \$12. Intensive course published jointly with The Massachusetts Institute of Technology.

THE ONSET OF STUTTERING: Research Findings and Implications—Wendell Johnson and Associates—*Univ. of Minn. Press*, 243 p., \$5. Findings show that the listener is more responsible for the development of stuttering than the speaker.

PIONEER SURGEON: Dr. Ephraim McDowell—Josephine Rich—*Messner*, 192 p., \$2.95. Biography for young people.

THE PIROTECHNICA—Varruccio Biringuccio, transl. from Italian with introd. by Cyril Stanley Smith and Martha Teach Gnudi—*Basic Bks.*, 2nd ed., 477 p., illus., \$8.50. This Italian metallurgical classic is third in the Collector's Series in Science.

PRECIPITATION FROM HOMOGENEOUS SOLUTION—Louis Gordon, Murrell L. Salatsky and Hobart H. Willard—*Wiley*, 187 p., \$7.50. Presents analytical methods for accomplishing precipitation from homogeneous solution so efficiently as to make reprecipitation unnecessary.

RADIATION FROM SLOTS IN CIRCULAR CYLINDERS—Hans Lottrup Knudsen—*Physics, Eng. and Chem. Corp.*, 57 p., 43 p. of figures, paper, \$5.50. Of interest to persons and laboratories working in the field of slot antennas.

READINGS IN GENERAL PSYCHOLOGY—Paul Halmos and Alan Iliffe, Eds.—*Philosophical Lib.*, 251 p., \$6. Representative samples of recent psychological writing in Britain.

REGENERATION IN VERTEBRATES—Charles S. Thornton, Ed.—*Univ. of Chicago Press*, 108 p., illus., \$3.25. Six papers on the vertebrate structures of the eye, the tail and the limbs: one of the Developmental Biology Conference Series.

SIMPLIFIED SATELLITE PREDICTION FROM MODIFIED ORBITAL ELEMENTS—Leonard N. Cormier, Norton Goodwin and Reginald K. Squires—*IGY World Data Center A (Nat. Acad. of Sciences)*, 54 p., illus., paper, \$1. IGY Satellite Report Series No. 7.

SPACE GUIDE—Vincent F. Callahan, Jr., Ed., Don Duggins, Contrib. Ed.—*Washington Space Letter*, 173 p., illus., paper, \$10. Concerned with research, development, production and procurement of the National Aeronautics and Space Administration (NASA).

TEACHING SCIENCE THROUGH HOLIDAYS AND SEASONS—Matthew F. Vessel and Herbert H. Wong—*Fearon Publishers*, 36 p., illus., paper, \$1.50. Science bulletin boards, ideas for exhibits and activities.

TECHNICAL REPORTING—Joseph N. Ulman and Jay R. Gould—*Holt*, rev. ed., 382 p., \$5. For students and practitioners of engineering and the sciences who have reporting jobs to do.

THE VERTEBRATE STORY—Alfred S. Romer—*Univ. of Chicago Press*, 4th ed., 437 p., illus., \$7. Story of the backbone animals, from the origins of the most elementary forms of fish life to the development of the human body, formerly called *Man and the Vertebrates*.

WELDING OF PLASTICS—J. Alex Neumann and Frank J. Bockhoff—*Reinhold*, 279 p., illus., \$7.25. Comprehensive treatment of all phases of this subject ranging from initial design procedures to final fabrication methods.

WHAT MAKES GUIDED MISSILES TICK—Barton Kemp—*Am. Electronics Co.*, 59 p., illus., paper, \$1.50. Explains guided missiles, their propulsion, telemetering and satellites in simple language.

YOUR DENTIST AND YOU: A Book to Improve the Patient's Understanding—Charles M. White—*Am. Press*, 91 p., \$2.50. A dentist, father of two dentists, tells of what the profession can do today for the patient.

Science News Letter, March 28, 1959

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GENERAL SCIENCE

Over-Population Threat

More public information concerning the dangers of overpopulation which threatens is needed together with information on other major social problems facing the nation.

► ONLY IF the American people understand the nature of over-population can this threat to the nation's survival be eliminated, Dr. Chauncey D. Leake, president-elect of the American Association for the Advancement of Science, has warned.

He urged the nation's scientists and leaders to take the people into their confidence on over-population and give the public knowledge on major social problems. Nine other major problems listed by Dr. Leake are:

1. Control of nuclear energy;
2. Water and air pollution;
3. Conservation of our natural resources and preservation of the inherent beauty of the earth;
4. Removal of the continuing threat of authoritarianism;
5. Preservation of the dignity of individual human beings;
6. Promotion of individual responsibility for self-sufficient old age;
7. Promotion of optimum physical and mental health;
8. Preservation of our comforts, conveniences and cleanliness, with equal opportunities for all in decent living; and
9. Understanding and controlling of our

individual and group prejudices, fears, anxieties and ambitions, so that we can enjoy the good life possible for us.

These problems, Dr. Leake said, are amenable to a scientific approach. He suggested that they be handled in this general way:

"Top priority should be given to more support, sympathy, appreciation, and better social recognition for basic scientific research. Basic science is concerned with getting verifiable information about ourselves and our environment.

"It is essential then to analyze and interpret this scientific knowledge freely for the benefit of the peoples of the world. This is a major scientific problem confronting us, dealing with the essentials of information theory, and of effective communication. We have to translate what science is about and what it is doing to our people in the language that they can understand."

Dr. Leake spoke at a luncheon marking the publication of "Perspectives in Virology," sponsored by the Institute of Microbiology, Rutgers University, under a grant by the Hartz Mountain Products Corporation, New York.

Science News Letter, March 28, 1959

PUBLIC HEALTH

Ancestors Felt "Fallout"

► OUR ANCESTORS of 200 or more years ago probably bumped into as much radioactivity as we do today.

Scientists do not have definite proof, but they suspect former generations were exposed to radioactivity as much as people living in the atomic age, James Terrill, assistant chief, division of radiological health, U. S. Public Health Service, said.

Until fairly recently, sanitary conditions were such that people did not bathe, or even wash their hands frequently. Since radioactivity can be washed off the body, present day sanitary facilities would tend to reduce the amount of radioactivity on the body.

Likewise, the lack of facilities years ago probably means that although there were no atomic blasts and fallout, a person still carried radioactivity on his body in granules of dust, soot and accumulated dirt, Mr. Terrill pointed out.

Pre-atomic age radioactivity was caused by naturally occurring radioisotopes and cosmic radiation.

The radiological health expert spoke at a meeting at which Arthur S. Flemming, Secretary of Health, Education and Welfare,

described the maximum permissible limits for lifetime exposure of the individual to specific radiation and radioactive materials, at the present time. (See p. 199.)

The strontium-90 level for permissible concentration is 80 micromicrocuries per liter of water or milk. A curie is the amount of radioactivity in one gram of radium. A micromicrocurie is one millionth of a millionth of a curie.

In other words, lump together all the foods an individual eats in his lifetime. If the average concentration for strontium-90 does not exceed 80 micromicrocuries for each 2.2 pounds of the food, the radioactivity for strontium-90 is within the now permissible level.

The degree of fluctuation in concentrations is demonstrated in the data for strontium-90 levels of milk in the St. Louis, Mo., area. There was an increase from 12.2 micromicrocuries in October, 1958, to 20.1 in November, 1958, which then dropped back to 15.6 in December.

The average for the year ended October, 1958, was 11.4 compared with 12.5 as the average of the year ended November, 1958.

Science News Letter, March 28, 1959

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ASTRONOMY

Study Moon Craters

Theories on the origin of the moon's craters include collisions between the moon and comets, according to one theory, or meteorites, according to another.

► COMETS smashing into the moon's surface caused the largest of its craters, Dr. Zdenek Kopal of the University of Manchester reports.

The present, widely held theory is that most lunar craters were formed by collisions with meteorites or asteroids. Dr. Kopal believes that if this were so, the many steep mountains and ridges now visible would have disappeared long ago because they would have been leveled by earthquake-like actions when the asteroids or meteorites exploded.

An American scientist, Dr. William G. Van Dorn of Scripps Institution of Oceanography, La Jolla, Calif., disagrees with Dr. Kopal's view. Arguments supporting both theories are reported in *Nature* (March 14).

The question of the origin of lunar craters and the maria, or seas, has recently been reopened due to observations, by the Russian astronomer Prof. N. A. Kozyrev of Pulkovo Observatory near Leningrad, of gas escaping from the central peak of the lunar crater Alphonsus.

Dr. Kopal believes the theory of collisions

with meteorites or small asteroids is seriously incomplete, and should be re-examined without regard to the observations of Prof. Kozyrev. Since comet heads are composed mainly of frozen hydrocarbons, they would release chemical energy in addition to the energy of their motion when smashing into the moon's surface.

This impact would not indent the lunar surface but would turn the rocks in the immediate area into lava, thus accounting for the maria. Dr. Kopal suggests the gas discharge observed by Prof. Kozyrev could result from accidental release of some gas deposited in Alphonsus by collision with a comet in the distant past.

Dr. Van Dorn cites the results of the Ranier underground atomic test in Nevada to show very little lava, if any, would be caused by a comet collision. Although he agrees that moonquakes could occur when sufficiently large objects strike the moon, Dr. Van Dorn believes the energy would not be enough for effects to be felt much beyond the impacting area.

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PHYSIOLOGY

Artificial Bladder Used

A new surgical technique has made it possible to give an individual with a diseased or malfunctioning bladder an artificial one to replace it.

► AN ARTIFICIAL bladder that carries urine to the outside of the body in a normal manner with full control is now a reality.

This bladder is possible due to a new surgical technique devised by Dr. Charles L. Reynolds of the Dallas Veterans Administration Hospital. The operation employs a segment of small intestine as a bladder for patients with cancer or other disease requiring removal of the bladder.

The operation has been performed on two veterans. The first patient, a 38-year-old man, volunteered for the operation after suffering more than ten years with a bladder diseased by a pre-cancerous lesion. The second operation was performed on another veteran last December. The first operation was completely successful. Present evidence indicates the second is also successful. More time will have to elapse to permit a definite conclusion, however.

The new technique involves removing the bladder completely. Then a segment of the small intestine, about eight to ten inches long, is cut out and left loosely attached to the blood supply within the body. The bowel is rejoined.

Then the segment is swung down in

the abdomen and attached to the urethra at about a midway point in an approximate "T" shape and one end of the segment is closed.

The ureters, or tubes from the kidneys to the bladder, are then attached to the segment. For five or six weeks the open end of the segment is attached to the skin to drain outside the body to clear mucus and infection. Later the artificial bladder is enclosed inside the body.

One delicate phase of the operation is attaching the ureters to the artificial bladder at the proper slant and precise point to create a valve-like action when the bladder is distended or contracted.

The operation itself is still in the investigative stages, Dr. Reynolds cautioned. The Veterans Administration describes the operation, a result of nearly three years of research, as "a true achievement in this type of surgery."

The surgery devised by Dr. Reynolds is similar in some respects to surgery devised by Dr. L. N. Pyrah, professor of urology at Leeds University in England, and by Dr. Sidney Weinburg of New York University.

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GEOPHYSICS

Excess Electrons Cause Polar Radio Blackouts

► TRILLIONS UPON trillions of wandering free electrons in the lowest layer of the ionosphere probably cause the polar radio blackouts that disrupt communications in Arctic regions.

Man's activities, and his safety, in the Arctic depend greatly on reliable radio contact, which sometimes becomes impossible on any frequency. Such disrupted communications occur when radio waves are completely absorbed in the ionosphere, the electrically charged layer of the earth's upper atmosphere that reflects radio waves.

Drs. J. C. Seddon and J. E. Jackson of the U. S. Naval Research Laboratory report to the U. S. National Committee for the International Geophysical Year (IGY) that the first measurements of electron density during a polar radio blackout were made by two rockets launched from Fort Churchill, Canada. Information telemetered earthward from these two rockets flights, plus a third, furnish "very strong evidence that a polar blackout is due to an abnormal number of free electrons in the D-region of the ionosphere."

They also report that moving electric charges play an important role in this effect. The polar blackout seems to involve little change in the E- and F-regions of the daytime ionosphere.

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Questions

ASTRONOMY—What is an annular eclipse? p. 202.

BIOCHEMISTRY—Where in the body is the melanocyte stimulating hormone naturally produced? p. 197.

PUBLIC HEALTH—How long does it take normal weather processes to remove radioactive debris from the troposphere? p. 199.

Photographs: Cover, George A. Smith; p. 195, U. S. National Committee-International Geophysical Year; p. 197, California Institute of Technology; p. 199, General Electric Company; p. 208, Eastman Chemical Products, Inc.

Do You Know

Four states in the U.S., Nevada, Arizona, California and Florida, are expected to have the largest population growth between 1955 and 1970.

A U.S. agriculturist recently estimated that the cost of farm labor in the U.S. has increased about 400% in the last 25 years.

North America has more than 1,000 kinds of trees.

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New Machines and Gadgets

For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE NEWS LETTER, 1719 N St., N.W., Washington 6, D. C., and ask for Gadget Bulletin 980. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

HAND MOP has a permanently attached plastic cup that wrings out the mop by being pushed down the wooden handle onto the cellulose strands. The strands are said to be highly absorbent, spongy, odorless, scratchless, dripless and durable. The mop is useful for all bathroom and kitchen chores.

Science News Letter, March 28, 1959

OIL AND GREASE CLEANER for removal of stains from all rough and porous surfaces such as concrete, brick and cinder blocks, is a combination cleaning and drawing compound that removes stains from deep within the pores rather than from just the surface. The liquid is applied by brush, allowed to stand a while, and hosed off with water.

Science News Letter, March 28, 1959

CARPENTER'S TOOL of aluminum combines into one unit a level, protractor, scale, bevel and square. The unit can be adjusted into various triangle shapes, or made into a T-square, and has a special scale for making common rafters and window sills.

Science News Letter, March 28, 1959

TOY FROGMAN of flexible, water-resistant polyethylene has no metal parts or rough edges. A rubber bulb and lead enable youngsters to propel the frogman,



shown in the photograph, through the water as the bulb is pressed. When the bulb is rotated, he turns. Air bubbles breaking to the surface from a tank on his back add a touch of realism.

Science News Letter, March 28, 1959

KITCHEN COLANDER of ivory-colored polyethylene is lighter than metal yet will not collapse even when fully loaded. It is not affected by chemicals, foodstuffs

or detergents, and can be cleaned with boiling water.

Science News Letter, March 28, 1959

SNACK TABLE SET consists of four plastic-topped tables each shaped like a circle with a curved segment cut out. Placed together, they form a single table shaped like a four-leafed clover. Three wooden legs on each table screw on or off. When not in use the tables may be stacked in twos.

Science News Letter, March 28, 1959

RADIOACTIVE ISOTOPE KIT, prepared for training students in nuclear science, but also useful for sample preparation and spectrum analyses, consists of micro-curie amounts of 14 long-lived isotopes. These are prepared in five-milliliter liquid solution and enclosed in half-ounce glass containers.

Science News Letter, March 28, 1959

STOP-WATCH HOLDER prevents damage to watches used in science and industry due to handling with wet, dirty, oily or greasy hands. Made of corrosion-resistant metal, it has three set screws to hold the watch in place and a rubber cushioning ring to protect the watch from damage if dropped. The holder does not interfere with operating the watch when held in the hand.

Science News Letter, March 28, 1959



Nature Ramblings



By HORACE LOFTIN

➤ THE FIRST reports of Sputnik I to reach the front pages probably did not cause a fraction of the excitement raised by a story on the earth's oldest satellite that appeared in the newspapers of the last century. According to this news account, the invention of a powerful telescope had enabled scientists to observe life on the moon!

Day by day the stories grew. At first, great cities were reported on the moon. Then the inhabitants were discovered: bat-like creatures with the general shape of humans, or humans with bat wings. Indignation was expressed at the fact that the moon's populace wore no clothes.

Before the story had run its course, quite an elaborate tale had been woven about the life of this old satellite. Finally the truth came out: an imaginative "reporter" had dreamed the whole thing up as a circulation stunt.

But we should not be surprised in this

Rambling Far Afield



age of man-made satellites to read one morning in our news papers an account on life from outer space. These reports will not—for some time—describe the fine details of genus and species of life on Mars or Venus. We must be satisfied with sketchy data gleaned from measuring devices in exploratory satellites. It will be enough at first to state definitely that life does or does not exist on the planets.

But sooner or later, and many eminent men of science believe sooner, we will be

landing space vehicles on the planets, probably first on Mars. Whether manned or unmanned, these vehicles will be able to gather important information about life from outer space and relay the information back to earth.

What will we find out there? Not the kinds of living things we are used to in our earthly nature ramblings, certainly. Assuming we do find evidences of life, this may be of several kinds.

First, there may be a form of "pre-life," representing the physical and chemical conditions that must have been present on earth just before the first living things appeared.

Then, there may be no existing life but signs of extinct living things. Or it may be similar to life on earth in general aspect, but differing in particulars in keeping with the unique conditions of each planet. Or it may be life based on a totally different system, perhaps without the carbon chemical basis of earth's life.

Science News Letter, March 28, 1959

